DOCUMENT RESUME

ED 337 452 SP 033 364

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TITLE Improving Instructional and Classroom Management Skills: Effects and Implications of a Staff Development Programme and Coaching for In-service Education.
PUB DATE Jan 91
NOTE 20p.; Paper presented at the International Congress for School Effectiveness and Improvement (Wales, United Kingdom, January 4-6, 1991).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Classroom Techniques; Discipline; Elementary Education; Foreign Countries; Inservice Teacher Education; *Instructional Improvement; *Multigraded Classes; *Staff Development; Teacher Effectiveness; Teaching Skills; Theory Practice Relationship; Time on Task; *Tutoring
IDENTIFIERS *Mixed Age Groups; Netherlands

ABSTRACT

This paper presents the results of a school improvement study (main field test) directed at schools with mixed-age classes in the context of inservice teacher education. A quasi-experimental treatment control group investigation was designed to test the effects of the staff development program "Dealing with Mixed-age Classes," and the effects of coaching in addition to the program. Based on pre-and post-training classroom observations, a significant treatment effect was found for pupil's time-on-task levels in mixed-age classrooms and for teachers' instructional and classroom management skills. On two aspects of instructional and classroom management skills larger gains were found for coached teachers: organizing instruction and dealing with disturbances. Time-on-task levels improved more strongly in classes of coached teachers. (Author/IAH)

Improving Instructional and Classroom Management Skills:

Effects and Implications of a Staff Development Programme and Coaching for In-service Education

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Paper presented at the International Congress for School Effectiveness and Improvement, University of Cardiff, Wales, Great Britain, january 4th - 6th, 1991.

ABSTRACT

This article presents the results of a school improvement study (main field test) directed at schools with mixed-age classes in the context of in-service teacher education. A quasi-experimental treatment-control group investigation was designed to test the effects of the staff development programme Dealing with Mixed-age Classes, and the effects of coaching in addition to the programme. Based on pre- and post-training classroom observations, a significant treatment effect was found for pupil's time-on-task levels in mixed age classrooms, and for teachers' instructional and classroom management skills. On two aspects of instructional and classroom management skills larger gains were found for coached teachers: organizing instruction and dealing with disturbances. Time-on-task levels improved more strongly in classes of coached teachers.

INTRODUCTION

This paper describes the results of a school improvement study directed at schools with mixed-age classes. The staff development programme described here was inspired by the findings from our observational studies in mixed-age classes and by the findings of a pilot investigation to test the effectiveness of this programme as it relates to areas of classroom management, instruction, and pupils' on task behaviour. Training topics were drawn from research on teacher and school effectiveness; the design of the training process was guided by the research on staff development effectiveness. This study assesses the effectiveness of the staff development programme in the context of in-service teacher education (main field test).

BACKGROUND

Increasingly, Dutch primary schools have no option but to introduce mixed-age classes (also called vertically grouped or multi-age classes), because of the drop in pupil intake, and

reduced staffing. In these classes, pupils from more than one grade level are taught simultaneously by one teacher. About 30% of all classes in primary schools are mixed age. Schools that now have mixed-age classes out of necessity without any experience of this form of organization, make greater demands on their teachers in terms of classroom organizational talents and devising effective teaching-learning conditions for all pupils.

During 1981-1985 three observational studies were conducted on learning and instruction in Dutch primary schools (Veenman, Lem & Winkelmolen, 1985; Veenman, Lem, Voeten, Winkelmolen & Lassche, 1986). The major objectives of these studies were to determine how a variety of instructional features influenced time-on-task in mixed-age classes. The results indicate that time-on-task levels in mixed-age classes are, on average, about 6% lower than in single-age classes; and that time-on-task in mixed-age classes is influenced by instructional features that include instructional setting or grouping arrangement, pupil's ability level, task difficulty and teaching behaviours. No significant differences in achievement test scores were found between pupils in mixed-age and single-age classes (Lem, Veenman & Voeten, 1990; Veenman, Voeten & Lem, 1987; Veenman, Lem, Voeten, 1988). Our interview data revealed that teachers in mixed-age classes were less satisfied with their jobs than their counterparts in single-age classes due to the heavy teaching load and the heavy demands on classroom management skills.

From these studies we concluded that the difficulties teachers face in mixed-age classes are centred around five problem areas: 1) the efficient use of time, 2) designing effective instruction, 3) classroom management, 4) the organization of independent practice or learning and 5) clear goals collectively agreed upon in making mixed-age schools work.

These observational studies were descriptive in nature. The next step was to design a staff development programme for teachers of mixed-age classes. This programme had to be schoolbased. The research was based upon three assumptions: a) research findings can be used to provide a systematic focus on teaching and schooling and thereby serve as a school improvement tool; b) research findings can be transmitted to school practitioners in forms if the findings are viewed as legitimate and useful guides to practice, and c) research findings can be interpreted positively by principals and teachers if careful attention is given to style and manner of delivery, with particular emphasis placed upon situation-specific issues that vary from one school setting to another (Griffin & Barnes, 1986).

In a pilot investigation (the first school improvement study) the first version of the staff development programme was designed and conducted by members of the research project staff from the Department of Educational Sciences, University of Nijmegen. Following seven three-hour workshops teachers in mixed-age classes implemented self-designed plans to increase selected research-derived teaching behaviours and pupils' time-on-task. A significant treatment effect was found for pupils' time-on-task levels in mixed-age classrooms and for teacher behaviours regarding effective instruction, lesson design and execution, classroom organisation and management (Veenman, Lem & Roelofs, 1989, 1990). Based on the findings of the pilot study the staff development programme was revised. However, a university research group has no regular task in the educational support structure for primary schools. School counselling services and teacher training colleges are responsible for co-ordinated in-service training programmes. So, in the main field test (the second school improvement study) the staff development programme was implemented by teacher educators and school counsellors in the regular educational support structure. This study assesses the effectiveness of the staff development programme as conducted by teacher educators and school counsellors.

The next section gives a brief outline of the content of the staff development programme

dealing with mixed-age classes (DMC).

THE RESEARCH BASE OF THE STAFF DEVELOPMENT PROGRAMME

Based on the identified problem areas, a handbook was developed entitled: 'Dealing with mixed-age classes: a programme for school improvement' (Veenman, Lem & Nijssen, 1988). This handbook covered the following five topics:

1. Instructional time

This topic is based on the notion that time is an essential element in learning and a potentially useful instructional variable. The way in which teachers and pupils spend their time provides valuable insights into the effectiveness of the teaching-learning process in mixed-age classes. Results of the syntheses of several thousand individual studies of academic learning conducted during the past half century in different countries show that instructional time has an overall correlation of about 0.4 to learning outcomes (Walberg, 1986; Fraser, Walberg, Welch & Hattie, 1987). Teachers were informed about the importance of concepts such as pupil-engaged learning time, time needed for and spent in learning, time allocation, pupils' success level, task appropriateness. Teachers were encouraged to use strategies that help pupils' stay on-task. Further, several observational methods were presented to observe pupils' time-on-task levels. Instructional time is an important topic for teachers in mixed-age classes because the complexity of the classroom organization may lead to lower levels of time-on-task.

2. Effective instruction

The research on effective teaching has yielded a pattern of instruction that is particularly useful for teaching a body of content or well-defined skills. In general, researchers have found that when effective teachers teach concepts and skills explicitly, they: begin a lesson with a short statement of goals; begin a lesson with a short review of previous, prerequisite learning; present new material in small steps; provide active practice for all pupils; guide pupils during initial practice; provide feedback and correctives, supervise pupils during seatwork or independent practice; review, weekly and monthly (Rosenshine, 1986; Rosenshine & Stevens, 1986). Teachers were informed of the findings of this research and of the key instructional behaviours as defined by Good, Grouws & Ebmeier (1983). They were encouraged to design lessons using these very specific components. Pupils in mixed-age classes work more in an individual seatwork setting. In this setting, significantly less time is spent on the task as compared to the whole class or direct instruction setting. Important steps in the lesson plans for teachers in mixed-age classes are guided and independent practice. After presentation of new material the teacher has to supervise pupils' initial practice to make sure that they can practice independently with minimal difficulty when the teacher is instructing another group of pupils. At that moment the teacher is too busy to supervising the first group.

3. Classroom management and organization

Classroom management includes all the things teachers must do to foster pupil involvement

and cooperation in classroom activities and to establish a productive working environment. Teachers were informed of ways to manage their classes, largely in the light of research conducted by Kounin (1970) and Evertson, Emmer, Clements, Sanford & Worsham (1984). According to Kounin successful managers are aware of what is happening in classrooms (with-itness), are able to handle two or more simultaneous events (overlapping), to sustain a group focus (group alerting and accountability) and to keep the action moving along smoothly (smoothness and momentum). Based on the work of Evertson et al. teachers were informed of ways of organizing a good room arrangement, planning and using classroom rules and procedures, managing pupils' work and maintaining good pupils' behaviour. In mixed-age classes teachers are probed more on their classroom management skills than teachers in single age classes (Veenman et al., 1986). Teachers in mixed-age classes with high levels of on-task behaviour were effective classroom managers. Their classes were well-organized and well-managed.

4. Independent learning

Pupils in mixed-age classes spend most of their time in an independent seatwork setting. While one group of pupils is working individually, the teacher is teaching another group. Therefore, pupils in mixed-age classes need to be adequately prepared during instruction. Teachers are informed of some instructional procedures that can help increase pupil engagement during seatwork, including e.g.: a) the teacher spends more time in demonstration (explaning, discussion) and guided practice, b) the teacher makes sure pupils are ready to work alone, by achieving a correct response rate of 80% or higher during guided practice, c) the seatwork activity follows directly after guided practice, d) the seatwork exercises are directly relevant to the demonstration and guided practice activities, e) the teacher guides the students through the first few seatwork problems (Rosenshine & Stevens, 1986). Attention is also given to the organization of multitasks: tasks in which pupils plan, select and organize materials and activities. In multi-task settings teachers are unable to control directly what each pupil is doing. In the programme teachers were informed of ways to structure the working environment, largely in the light of Kierstead's work (1986). One aspect of the multi-task setting is the use of the pupils' work cycle; a set of routines, procedures, rules and consequences that spells out for pupils exactly what is expected of them: how they are to proceed and to account for the responsible use of their time.

5. School climate and school leadership

Teachers and their principals were given some results of the research on school effectiveness. In general terms the importance of cooperation, collegiality, shared values and norms and instructional school leadership. In our research we found that some teachers in mixed-age classes felt very isolated from their colleagues working in single-age classes. Some outcomes of school effectiveness research highlighted: school site management, active leadership, high expectation for pupils, change-supportive norms, school-wide staff development, clear goals, collaborative planning and collegial relationships (Purkey & Smith, 1983; Good & Brophy, 1986). The content of this part of the programme was not directed at changing teaching behaviours, but on stressing the importance of shared problem solving, peer support and a planned, purposeful programme for dealing with mixed-age classes on a school-wide basis.

The contents of the programme are integrated into a model for school and classroom effectiveness. This model comprises the components: leadership, school climate, teacher behaviours, pupil behaviours and pupil achievement (cf. Squires, Huitt & Segars, 1983). Each chapter of the programme contained a rationale, definition of terms, and specific recommendations and guidelines for implementing the instructional behaviours in mixed-age classes. To facilitate understanding and use, numerous case studies were provided, along with several checklists. Some teaching behaviours were presented by trained teachers in the form of videotapes; videotape designed specifically for the purpose of demonstrating effective teaching and classroom management.

Coaching for application

Research on training effects identifies a frequent failure to transfer new knowledge and skills to classroom practice, or, if initial transfer was accomplished, a rapid attrition of new behaviours over time. Few studies have actually measured transfer effects of training. Recent analysis of the existing literature on transfer have shown that the gradual addition of tranining elements does not appear to impact transfer noticebly (Effectsize of .00 for information or theory; theory plus demonstration; theory, demonstration and feedback; ES of .39 for theory, demonstration, practice and feedback). However, a large and dramatic increase in transfer of training- ES 1.68- occurs when in-class coaching is added to an intial training experience comprised of theory explanation, demonstrations, and practice with feedback. (Bennett, 1987; Joyce & Showers, 1988)

Joyce & Showers (1980) define coaching as: "Hands-on, in-classroom assistance with the transfer and application of skills to the classroom." Following initial training, coaching is a cyclical process designed as an extension of training. Early coaching sessions provide opportunities for checking performance against expert models of behaviour. As the process of coaching moves on, coaching conferences between teacher and coach take on the character of collaborative problem solving, which often conclude with joint lesson planning and searching for curricular materials for appropiate use of strategies.

The process of coaching includes five major functions: (1) provision of companionship, (2) the giving of technical feedback, (3) the analysis of application, (4) adaptation to the students and (5) personal facilitation. The first function is to provide interchange with another human being over a difficult process like a new teaching strategy. The coaching relationship results in the possibility of mutual reflection, the checking of perceptions, the sharing of frustration and succes, and the informal thinking through of mutual problems. The second function, providing technical feedback, helps ensure that growth continues through practice in the classroom. Technical feedback includes pointing out ommissions in the teaching strategy, examining how materials are arranged, checks to see whether all the parts of the teaching strategy have been brought together. Analysis of application, the third function of coaching, involves activities like selecting appropriate occasions for the use of a newly acquired teaching strategy. Time is spent on examining existing curriculum materials for the adequate use of the strategy. The fourth function of coaching, adaptation to the students, involves learning how to teach the new strategy to the children. The fifth function of coaching, facilitation, refers to help given to teachers to feel good about themselves as the early trials take place.

Coaching appears to contribute to transfer in five ways. (1) Coached teachers generally practice new strategies more frequently and develop greater skill in the actual moves of a new teaching strategy than do uncoached teachers (Showers, 1982). (2) Coached teachers

use their newly learned strategies more appropiately than uncoached teachers (Showers, 1982; 1984). (3) Coached teachers exhibit greater long-term retention of knowledge about and skill with strategies in which they were coached, and further increased the appropriateness of use of new teaching models over time (Baker, 1983). (4) Coached teachers are more likely to teach new models of teaching to their children (Showers, 1984). (5) Coached teachers exhibit clearer cognitions with regard to the purposes and uses of the new strategies (Showers, 1982; 1984).

RESEARCH QUESTIONS AND HYPOTHESES

The study examined the effects of a staff development programme that introduced selected findings from teaching effectiveness research into ongoing school settings with mixed-age classes. Also the effects of coaching in addition to the staff development programme were evaluated. Five hypotheses and one question guided this study. The hypotheses were:

1. Teachers who participated in the staff development programme Dealing with Mixed-age Classes (DMC) show increases in the frequencies of research-derived teaching behaviours compared with control group teachers.
2. In classes of teachers who participated in the DMC programme there is a positive effect on time-on-task rates.
3. Teachers who received coaching in addition to the DMC programme will show larger gains in research-derived teaching behaviours compared with teachers who did not receive coaching.
4. In classes of coached teachers gains in time-on-task rates are larger than in classes of uncoached teachers.

Further, one question concerning the effects of coaching was investigated:

5. How and to what extent are coaching effects related to the way coaching was actually performed?

On-task pupil behaviour was used as a proxy for pupil achievement. (See Evertson, Emmer, Sanford & Clements, 1983; Griffin & Barnes, 1986.)

DESIGN

The study was designed as a quasi-experiment with two treatment groups: uncoached teachers (N=10) and coached teachers (N=18), and one control group (N=14), and the pupils associated with each teacher.

PARTICIPANTS

The staff development programme was part of the regular in-service training activities of the college of education for primary teachers (PABO) in six school districts. A total of 88 teachers volunteered to participate in the study. This group of teachers comprised 10 school

teams (all the teachers in a school) and three teachers from another school. For logistical reasons (budget, time constraints and available staff members) 28 teachers out of these school teams were selected for participation in the observational study (treatment group). These teachers were selected by the staff members before the beginning of training to ensure that from each team two or three teachers were selected to represent grades 3-8. The teachers' teaching experience in the coached group ranged from 12 to 31 years (mean: 19.9 years) ; in the uncoached group the experience ranged from 3 to 26 years (mean: 15.3 years). School cousellors from each participating school district were asked to select schools, that were roughly equivalent to the treatment group schools for purposes of forming a control group. The resulting control group contained 14 teachers from 6 schools. Their teaching experience ranged from 5 up to 32 years (means: 20 years).

INSTRUMENTATION

The instruments used to measure the quantity and quality of programme implementation and pupils' time-on-task levels were largely based on the instruments used in our first study (Veenman et al., 1986; Lem, Veenman, Nijssen & Roelofs, 1988). These instruments included an observation instrument, a classroom rating scale and teacher questionnaires.

Time-on-task and instructional skills observation

Observational data on pupils' time-on-task levels were collected by a 'predominant activity' time sampling procedure (Tyler, 1979). To obtain information on the behaviours of teachers and pupils a predetermined observational sequence was set up. The observer took a quick look at the behaviour of the first pupil and that of the t. .her for seven seconds and recorded the responses at the particular instance during the next thirteen seconds. After this recording the observer switched to the next pupil, repeating the same procedure. After observing all pupils the observer started the observational procedure again at pupil number one. Each observation period lasted 40 minutes. The observations were executed using forms, which could be processed by an optical scanner. An observation-timer gave two optical and auditive signals; one for the start of an observation period and one for the start of a coding period.

The observers recorded the following four pieces of information: a) the pupils' response to the task (e.g. on-task, off-task); b) the target group of the teacher (e.g. grade level 5 or 6); c) the task-related activities of the teacher (e.g. supervision, guided practice); and d) the settings in which learning activities occurred in each grade (e.g. group instruction, seatwork). The observation instrument included 20 categories. The most important observational variables used in this study are listed in Table I.

Prior to collecting observational data, the four observers went through a training programme of about 45 hours. Inter-observer reliability checks, estimated by analysis of variance (Winer, 1971), ranged from 0.82 to 1.00 (median 0.91; with the exception of one category: off-task procedural: .74). All classrooms were visited at different times by different observers to control for observer effects. In most cases one classroom was observed by three different observers.

Classroom rating scale

After each observation, the Management & Instruction Scale (MIS) was completed by the observer to assess teacher and pupil behaviour on a number of variables. The MIS consisted of 41 five-point rating scales that focused on instructional skills, lesson design and execution, managing pupil behaviour, classroom organization and pupil behaviours such as the level of disruptive and inappropriate behaviour. The items of the MIS are based on the research of Evertson et al.(1983), Good et al. (1983) and Rosenshine (1986) The MIS was constructed during the first improvement study (Veenman, Lem, Roelofs, 1989). In that study the MIS contained 30 items, representing five subscales: 1) instructional skills; 2) organizing instruction; 3) use of materials and space; 4) adjusting instruction; and 5) dealing with disturbances. In this study ten items were added to the subscale "instructional skills", to represent the Direct Instruction Model more adequately (Rosenshine, 1986). This revised subscale contained 17 items instead of 7 items. The alpha-coefficients of internal reliability for the subscales ranged from 0.81 to 0.91 (see Table III and IV). Inter-observer reliability checks on all subscale-sores, estimated through analysis of variance, ranged from 0.67 to 0.92 (median 0.84).

Questionnaires

Questionnaires were used to get information on the teachers' perception of the staff development programme, received coaching, the booklets, the programme book workshops, and their reports of their experiences with the implementation of the contents of the programme. These questionnaires were submitted to all 88 teachers who participated in the DMC programme. Of these teachers 76 returned the questionnaire.

DATA COLLECTION

Observational data were collected in mixed-age classrooms of 28 teachers who voluntarily participated in the DMC programme (treatment teachers) and 14 control teachers. Before the start of the programme, each teacher was observed during two mathematics periods and two reading/language periods (November-December 1989). After the programme was provided each teacher was again observed for two mathematics and two reading/language periods (May-June 1990). All observations took place in the morning.

The observational data for each observation period, collected through the time-sampling procedure, were expressed in minutes. Next, the pupil and teacher behaviours within each category on the instrument were averaged to produce means per category for each class and teacher for each observation. Finally, the observations in each subject area, mathematics and reading/language, were collapsed to produce mean rates for each observation period: pre and post treatment data. It was recognized that the observational variables were not independent of each other: coding an event into one category excludes all other categories at the same time interval.

For the observational data, collected by the rating procedure, subscale scores were computed by adding the values of the item responses for each subscale. In testing the differences between treatment teachers and control teachers, a level of significance of 5% was used (one-tailed). The unit of analysis was the class or teacher.

For a complete description of the design, the instrumentation, and data collection

procedures see Roelofs, Raemaekers & Veenman (1991).

THE DMC INTERVENTION

Pre-training

The staff development programme was implemented by teacher educators and school counsellors on six locations in the Netherlands. Two months before the actual start of the training all teacher educators and school counsellors received a pre-training. This training was provided by members of the project staff and contained DMC related activities. Attention was paid to observing time-on-task behaviour, teaching according to the direct instruction model, managing mixed-age classes and organizing seatwork. Special attention was paid to the explication of the school leaders' role during the training period and to strategies of coaching which could be used by the school counsellors.

To make sure that training activities on the six locations would be comparable, detailed plans for training and coaching were made by the participating teacher educators and school counsellors. These plans were discussed with members of the project team.

The pre-training was valued positively, although there were large differences between participants from the six locations, which partly reflected the attitude toward the research project. Generally all teacher educators and school counsellors felt well-prepared for the job of implementing the DMC-programme, including training as well as coaching.

Training

On four locations the training was provided by experienced teacher educators in collaboration with school counsellors from the local school counselling services. Coaching was given by the school counsellor. On one location, training as well as coaching were provided by the school counsellor from the local school counselling service. On the sixth location, a training programme without coaching was given by an experienced teacher educator.

The 88 teachers of the 11 schools participated into six workshop-groups. In order to get acquainted with each other and to come to agree on objectives and design of the training and the coaching, trainer, coach and school staffs consulted each other. An introductory booklet briefly discussed the DMC's general rationale and the used model for school and classroom effectiveness.

Prior to training, information based on the observational data collected in four observation periods, was fed back to the 28 observed teachers by members of the project team. This feedback contained information about time-on-task rates in classrooms, instructional and management skills and detailed narrative reports of observed lessons. The purpose of the DMC-intervention however was not to tell teachers how they had to teach. Teachers were provided with major concepts and tools so that they could hopefully analyze their teaching in the light of the fed back research findings.

The number of workshops varied between five and seven, most of them were two weeks apart (January-April 1990). During these workshops all topics were covered. Between the workshops teachers were asked to try out in their classrooms some of the teaching recommendations as described in the programme. 18 teachers received additional coaching

during these try-outs. The first workshops were devoted to the following topics: instructional time, effective instruction, classroom management and organization, and independent learning. Teachers were encouraged to supplement the research-based information with their own craft knowledge and to look for improvement opportunities. Particular attention was paid to the instructional improvement in this iterative cycle: 1) information collection (this was done at the first by the observers); 2) comparison of collected information with research findings and/or own standards and identification of improvement opportunities; 3) selection and preparation of strategies for classroom modification; and 4) implementation of classroom modifications. The teachers who had not been observed during the pre-planning phase, were also asked to prepare improvement plans, using their own observations or judgements and the provided research findings. The last workshop was devoted to the topic of school climate and school leadership, and to a brief evaluation of the worth and merit of the staff development programme. The questionnaires were also handed out. The post-training observational data were fed back to the observed teachers at the beginning of the new school term (September 1990).

In designing the workshop activities the training process was guided by the recommendations of Joyce & Showers (1988) for effective staff training. The five major suggested components of training are: 1) presentation of theory; 2) modelling or demonstration; 3) practice; 4) structured feedback; and 5) coaching. The theory was presented in the handbook. Modelling or demonstration of the suggested teaching skills was done through video-fragments, suggested activities and case studies in the handbook. Practice under simulated conditions was achieved by practising with peers (role-playing); practice under real conditions was achieved by asking teachers to try out new ideas or improvement plans and to tell each other at the next workshop what new things they had tried in their classes and how they worked. Feedback was given by observers before the start of the first work shop.

Coaching

As noted above, coaching was given by the regular school counsellor, immediately after each workshop. Subjects covered in one workshop session formed the basis for the subsequent coaching session. Teacher skills and activities concerning effective use of time, effective instruction, classroom management, and independent learning were translated into clinical assessment forms. By means of these forms discrepancies between teachers' performance and the ideal toward which they were aiming, could be identified.

Each coaching session contained three groups of activities: pre-observational discussion, observation of a lesson, post-observational discussion, containing plans for improvement. Before the lesson, the teacher and the coach discussed about which topics would be observed during the lesson. Teachers chose main points for observation from the clinical assesment forms. During the lesson the coach used these forms to record teacher and pupil activities. In certain cases, pupils' time-on-task rates were recorded in addition to teacher behaviours. The results of the observations were discussed immediately after the lesson, during breaks or during lunch time. Sometimes a school leader took over the class of the coached teacher for this purpose. The coach gave suggestions and ideas for the improvement of teaching behaviour. Each coaching session was concluded with plans for improvement. During the next coaching session this plan formed the basis for new observations. Meanwhile, the coached teacher might have chosen additional points for observation, drawn from topics covered during subsequent workshop sessions.

RESULTS

Descriptive statistics for teacher and pupil behaviour based on the time-sampling observation method described above, are presented in Table I. The SPSSX one tailed t-test for paired samples was used to examine the difference between the pre- and the post-treatment data of the experimental group to determine the effects of the DMC programme on desired behaviours. Independent one-tailed t-tests were used to examine the difference between the treatment-group and the control group. Results of these tests, based on gainscores (post-test scores minus pre-test scores), are shown in Table I.

Table I: Mean frequencies (in minutes) of observation categories, and results of t-test on gain scores for treatment and control teachers (lesson period = 40 minutes)

	PRE-TEST DATA		POST-TEST DATA		PRE-POST GAIN		
OBSERVATION-CATEGORIES	TREAT-MENT	CON-TROL	TREAT-MENT	CON-TROL	TREAT-MENT	CON-TROL	*p*
PUPIL BEHAVIOUR							
On-task	27.9	27.7	30.4	28.5	2.5	0.7	*
Off-task:							
- procedural	3..	2.9	2.3	2.8	-1.0	-0.1	*
- waiting	1.9	1.7	1.3	1.5	-0.5	-0.1	N.S.
- not-engaged	7.0	7.8	6.1	7.2	-1.0	-0.5	N.S.
TEACHER BEHAVIOUR							
Instruction:							
- review previous work	0.2	0.1	1.6	0.4	1.5	0.2	**
- presentation	21.0	21.6	20.1	20.5	-0.9	-1.1	N.T.
- guided practice	0.6	1.0	1.0	0.1	0.4	-1.0	**
Controlling seatwork:							
- individual help	6.3	7.9	6.0	7.6	-0.3	-0.3	N.T.
- monitoring	5.0	4.0	5.1	6.2	0.0	2.3	*
Organizing:							
- transitions	5.4	3.9	5.2	3.8	-0.2	-0.1	N.S.
- no teaching behaviour	1.5	1.5	1.1	1.5	-0.4	0.0	N.S.

Note:* p <.05; ** p <.01; N.S.= non significant; N.T.= not tested for implementation (the variables length of presentation and individual help were included in the observational system, not in the objectives of the training programme); treatment group N=28; control group N=14.

Table II: Average percentages of time-on-task per setting, and results on t-test on gain scores by group (lesson period = 40 minutes)

	PRE-TEST DATA		POST-TEST DATA		PRE-POST GAIN		
SETTING CATEGORY	TREAT-MENT	CONTROL	TREAT-MENT	CONTROL	TREAT-MENT	CONTROL	*p*
Instruction * on-task	72.0	75.7	80.1	80.6	8.1	4.9	N.S.
Seatwork * on-task	67.7	65.8	74.1	66.1	6.4	0.3	*

Note: * p <.05; ** p <.01; N.S.= non significant; treatment group N=28; control group N=14.

The results in Table I indicate that the DMC programme had a significant effect on pupils' time-on-task rates. After training, treatment group pupils exhibited significant increases in their time-on-task levels: 69.8% (27.9 minutes) before training and 76.0% (30.4 minutes) after training (p <.01). The difference in gain-scores between experimental and control group is significant (p<.01).

Table II presents time-on-task levels during class instruction and individual seatwork for treatment group pupils and control group pupils. In terms of DMC intervention's effect upon pupils behaviour, treatment group pupils showed a large gain in on-task behaviour during seatwork (p <.01) compared with control group pupils. No treatment effect was found on time-on-task levels during instruction, because control group pupils also showed a gain in this respect.

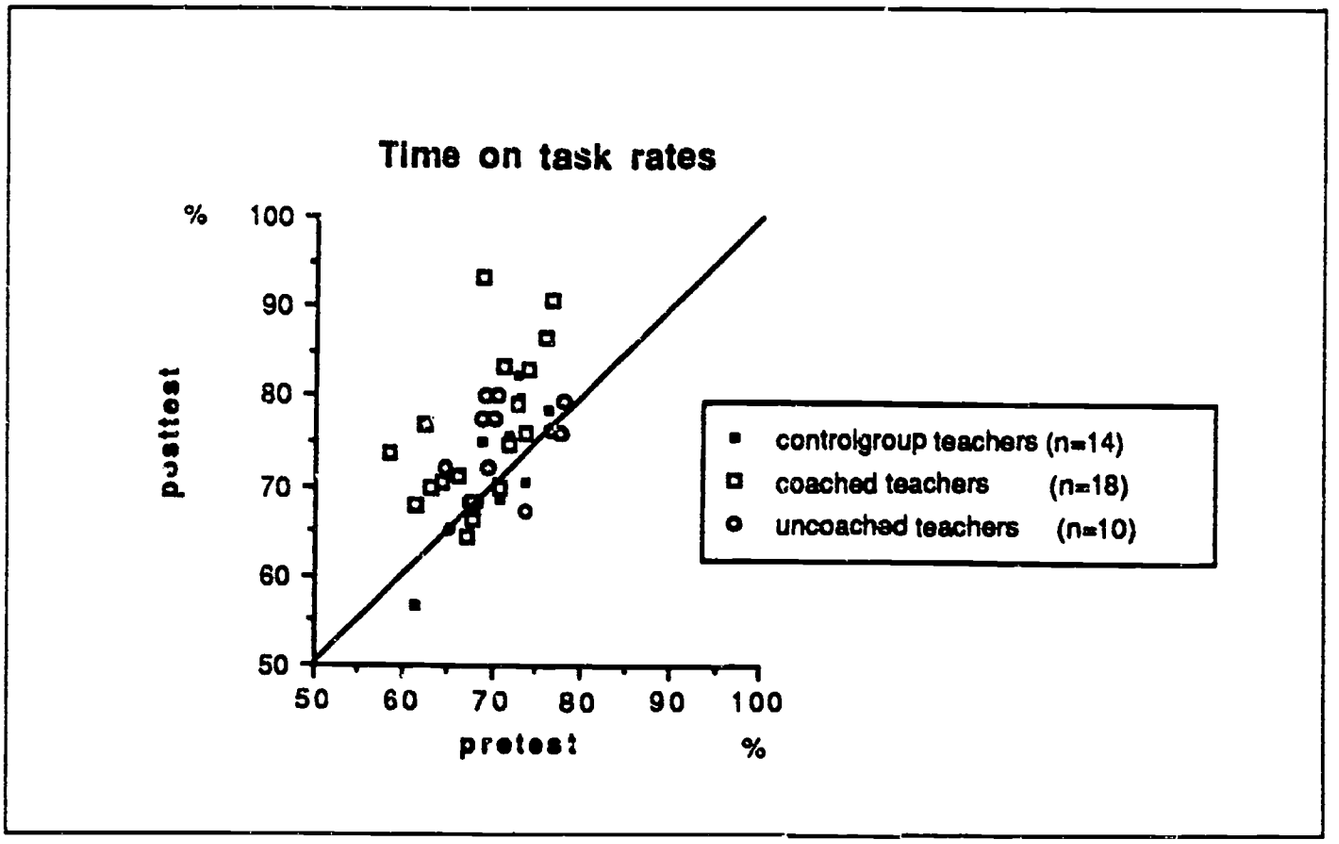

Figure I: Time on task rates before and after the DMC programme

Figure I shows a scatterplot in which control group teachers and all DMC teachers, coached and uncoached, are compared in terms of gains in time-on-task rates.

Table III: Mean rates on the Management & InstructionScale (MIS) and results of *t*-tests on gain scores

	PRE-TEST DATA		POSTTEST DATA		PRE-POST GAIN		
	TREAT-MENT	CONTROL	TREAT-MENT	CONTROL	TREAT-MENT	CON-TROL	
SUBSCALES MIS	Mean	Mean	Mean	Mean	Mean	Mean	*p*
Instructional skills (17 items; α = .87)	54.3	56.4	63.2	56.8	8.9	0.4	**
Organizing instruction (5 items; α = .81)	18.2	19.5	20.1	19.1	1.9	-0.4	**
Use of material and space (6 items; α = .81)	24.5	25.4	27.0	26.0	2.4	0.6	*
Adjusting instruction (6 items; α = .91)	21.9	22.9	23.6	22.1	1.7	-0.9	**
Dealing with disturbances (6 items; α = .91)	20.2	20.9	23.8	21.9	3.6	1.0	*

Note: * p <.05; ** p <.01; treatment group N=28; control group N=14.

Table IV: *T*-tests on gain scores for coached and non-coached teachers regarding subscales of the Management and Instruction Scale (MIS) and pupils' time on task rates

	PRE-TEST DATA		POSTTEST DATA		PRE-POST GAIN		
	COA-CHED	UNCOA-CHED	COA-CHED	UNCOA-CHED	COA-CHED	UNCOA-CHED	
	Mean	Mean	Mean	Mean	Mean	Mean	*p*
SUBSCALES MIS:							
Instructional skills	53.8	56.0	61.2	64.4	7.4	8.4	N.S.
Organizing instruction	17.5	19.9	19.7	20.5	2.2	0.6	*
Use of material and space	23.9	24.8	26.7	27.5	2.8	2.7	N.S.
Adjusting instruction	21.0	23.9	22.7	24.7	1.8	0.8	N.S.
Dealing with disturbances	18.6	23.1	23.0	25.2	4.4	2.0	*
TIME-ON-TASK RATES							
During the whole lesson	67.1	73.5	75.4	75.5	8.3	2.0	*
During instruction	70.0	75.3	79.8	79.7	9.8	4.4	N.S.
During seatwork	64.6	71.4	73.9	72.4	9.3	1.0	*

Note: * p <.05; ** p <.01; N.S.= non significant; coached group N=13; uncoached group N=7.

The picture indicates that the largest gains in time-on-task were attained in classes of coached teachers. To test the difference in gain-scores between coached and uncoached teachers, only those teachers were selected who participated in workshops, where some of the teachers were coached and some were not. This was done to make sure that a pure coaching effect would be tested. This means that the results of three locations were left out of this analysis, to test the programme effect and the coaching effect separately. Table IV shows the results of these tests. Teachers who received coaching had larger gains in terms of pupils' time-on-task levels ($p < .05$). Table IV also shows that this effect can be explained by the significant gain in time-on-task levels during seatwork ($p < .01$). No significant effect was found for time-on task during instruction.

Table I also summarizes some of the teacher behaviours to estimate the degree of programme implementation. Significant differences in gain scores were found for the variables 'review of previous work' and 'guided practice' (both $p < .01$). No significant effects were found for transitions and unrelated activities, although the differences were in the expected direction. A significant effect in the opposite direction was found for monitoring ($p < .01$). Control group teachers showed more monitoring behaviour after the DMC intervention compared with DMC teachers. There seems to be no logical explanation for this finding

Table IV displays differences between coached and uncoached teachers in terms of scores on the MIS. It must be noted that there are important pre-test differences between coached and uncoached teachers. Comparing the coached and uncoached teachers, it can be concluded that in general, the gains in instructional and management skills were larger in the coached group. Significant coaching effects were found for organizing instruction ($p<.01$) and dealing with disturbances ($p<.01$).

Table V shows a comparison between coached teachers who showed large gains in direct instruction skills (subscale instructional skills) on the one hand and coached teachers with small gains on the other hand. Both groups were asked to rate the received coaching in terms of important features. In this analysis, the results from one location (three teacher's) were left out because of problems with filling out the rating forms. The results of one location, left out in testing the pure coaching effect, were now included.

A difference of .5 on the Likert-scale ratings was interpreted as meaningful, under the condition of small standard deviations in both groups. The results were also tested for significance by means of a t-test for independent samples. The results indicate that the high gain group on the whole rated the received coaching as more adequate than the low gain group did. Coaches from the high gain group tended to give more ideas and suggestions, provided feedback that was more useful for planning next lessons compared with coaches from the low gain group. Surprisingly according to teachers in the high gain group their coaches didn't make frequent use of checklists compared with coaches of the low gain group. Even larger differences existed in terms of the way in which the analysis of application was dealt with. The analysis of application of the direct instruction model and seatwork strategies during math lessons and with respect to the math curriculum was far better in the high gain group. Besides, the teachers rated the suggested plans and change strategies as more feasable than their collegues in the low gain group.

Table V: Comparison between coached teachers with high and low gains in instructional skills in terms of the received coaching and results of t-tests

	HIGH GAINSCORE (N=6)		LOW GAINSCORE (N=9)		
TEACHER RATINGS OF COACHING FEATURES	MEAN	SD	MEAN	SD	*p*
Support (α=.80)	4.0	0.4	3.3	0.6	N.S.
1. Coach shared ideas and suggestions with teacher	4.0	0.6	3.2	0.8	*
3. Coach gave suggestions and ideas	4.2	0.4	3.4	0.5	*
6. Coach and teacher had a positive relationship	3.8	0.7	3.4	0.7	N.S.
Global feedback (α=.87)	3.9	0.3	3.7	0.6	N.S.
1. Coach pointed out weak points in teacher behaviour	4.0	0.0	3.9	0.6	N.S.
2. Provided feedback was useful for planning next lessons	4.0	0.0	3.5	1.1	N.S.
4. Coach used checklists for feedback	2.6	1.1	3.9	0.6	*
5. Teacher gave his own feedback on specific problems	3.8	0.7	3.6	1.1	N.S.
Specific feedback (α= .65)	3.6	0.2	3.3	0.8	N.S.
1. Feedback was given in the light of workshops contents	3.2	0.4	3.0	0.9	N.S.
2. Coach used workshop assignments	3.8	0.4	3.5	0.9	N.S.
Analysis of application (AA) (α= .83)	3.7	0.6	3.1	0.6	*
1. Experimentation with new ideas and strategies	3.3	0.8	3.4	0.7	N.S.
2. AA: direct instruction model with reading/ language curriculum	3.5	1.4	3.1	1.1	N.S.
3. AA: direct instruction model with math curriculum	4.6	0.5	3.3	0.7	**
4. AA: seatwork strategies during reading/ language lessons	3.3	1.4	3.0	0.7	N.S.
5. AA: seatwork strategies during math lessons	4.6	0.5	2.9	0.8	**
6. Practical feasab''' of suggested plans and strategies	3.7	0.8	2.8	0.7	*
7. Clarity of suggested change strategies	3.5	1.0	3.1	0.6	N.S.
Adaptation to students (α= .73)	2.8	1.1	2.4	0.5	N.S.
1. Coach pointed to students reactions	3.0	1.0	2.6	0.7	N.S.
2. Coach made plans to make students acquainted with new teacher behaviour	2.6	1.3	2.1	0.6	N.S.
3. Coach took into account individual differences between students	3.0	1.1	2.6	1.2	N.S.
Fit coaching to workshop contents (α= .73)	3.7	0.3	3.2	0.4	*
1. Fit to productive learning time	3.2	1.0	3.4	0.7	N.S.
2. Fit to direct instruction	4.2	0.4	3.7	0.5	*
3. Fit to classroom management	3.5	0.8	2.9	0.6	N.S.
4. Fit to independent learning	4.0	0.6	2.8	0.9	*

Note: * p <.05; ** p <.01; N.S.= non significant; high gainscore group N=6; low gainscore group N=9.

Finally, different ratings were given by the two groups with respect to the fit of the received coaching to the workshop contents direct instruction, classroom management and independent learning. It is important to note that no differences were found between the two groups in their ratings of the workshop contents and workshop execution. However, teachers from the low gain group rated the contents of the DMC programme as more consistent with their own opinions and beliefs about teaching compared with teachers from the low gain group.

DISCUSSION

In this study, implementation effects of the DMC staff development programme were evaluated in the regular context of in-service training. The DMC programme was executed by teacher educators, the additional coaching was given by school counsellors.

Four hypotheses regarding implementation guided this study. The first hypothesis stated that DMC increases teacher's instructional and management skills. This hypothesis is confirmed. Trained teachers show important gains in instructional skills and in the way they organize instruction and adapt it to their pupils. They improve markedly on classroom management skills like the use of material and space, and dealing with disturbances. So, two important identified problems in mixed-age classes can be dealt with by means of a regular staff development programme.

The effects of the DMC programme on pupil behaviour, expressed in terms of gains in time-on-task levels are moderate. In classes of trained teachers time-on-task levels increased substantially. This confirms the second hypothesis. The largest gains in pupils' time-on-task levels were found during periods of seatwork. This finding is encouraging, because it was noted that the main loss of academic learning time took place during periods of seatwork.

The third hypothesis stated that coached teachers attain larger gains than uncoached teachers regarding recommended teaching behaviours. This hypothesis is partly confirmed. On two aspects of instructional and management skills larger gains were found for coached teachers: organizing instruction and dealing with disturbances. It must be noted however that the sample of uncoached teachers was relatively small and differed considerably from the sample of coached teachers. Uncoached teachers showed higher skill levels before the training.

The fourth hypothesis, in which was claimed that time-on-task levels improve more strongly in classes of coached teachers, is also confirmed. Again, this effect was mainly due to the fact that periods of seatwork were more productive.

Based on the findings of the main field study, we can draw some conclusions. First, it appears to be possible to execute a staff development programme succesfully, which means effectively, in the regular context of in-service training. Second, results of the questionnaire suggest that the handbook has been studied and used by teachers in grades 1-8. Almost alle teachers reported that the handbook was very helpful because it provided many concrete, specific and practical suggestions. The case studies in the handbook were rated as particularly valuable because they provided concrete illustrations of how other teachers in mixed-age classes had implemented particular strategies. These positive ratings of the staff developement programme may have contributed to implementation of the programme. Third, the effects on teacher instructional skills, management skills and pupil behaviour in the main field study are somewhat smaller than in the pilot study (Veenman, Lem & Roelofs, 1989,

1990). This finding is similar to Wade's finding concerning the effectiveness of staff development programmes (1985) initiated, developed and conducted by a university. There might be at least two explanations for this. First, large differences were found in the way the programme was actually executed on the different locations. Correspondingly, participants in the six locations valued the programme quite differently. Second, the teacher educators and the school counsellors valued the programme preparation training differently. As a result there may have been differences from the start in the ability to realize the program.

A new aspect in this study was the provision of coaching as an additional element to training activities. In general, results from the questionnaires indicated that teachers considered the DMC-programme as "more practical", better fitted to their needs, when coaching was given. However, not all coached teachers showed progress in instructional skills and time-on-task rates. This finding was related to the way coaching actually was performed (open research question). Results indicated not all functions of coaching have been dealt with equally. Teachers who improved strongly on direct instruction skills rated the received coaching more positively than teachers who improved weakly. This finding might have been related to a difference in the extent to which workshop contents correspond with teacher beliefs and opinions about teaching.

Some coaches identified problems related to their interaction with teachers: problems with reflecting on teaching behaviour, and the absence of willingness to speak openly about problems related to teaching. These problems will be discussed in forthcoming research.

There are some limitations to this study. First, the size of the sample is relatively small, resulting in a low power of the statistical tests. Second, as usual in field-experiments, we could not completely control the effects of selection. The effect of selection for training was controlled, but we could not do so for coaching. The coached teachers appeared to start at a lower level of the valued instructional skills than the uncoached teachers. These teachers might have participated in coaching because of special needs. Besides, this selection may have caused ceiling effects in the uncoached group.

Two questions remain unanswered in this study: First, what will be the effect of coaching when all functions of coaching are dealt with adequately? Second, what will be the long-term effect of the DMC-programme on teacher and pupil behaviour? This question, if and how training and coaching contents get institutionalized, will be answered in a follow-up study which has been planned for the next two years.

Acknowledgements

The research reported here was supported by a grant from the Institute for Educational Research in the Netherlands (SVO-project 9343). The authors gratefully acknowledge the following persons for their contributions to this study: Clea Evers, Maarten van Mierlo, Elize Riemeijer, Maria Stadelman, Nelleke Hofs, and the participating principals and teachers for their cooperation.

REFERENCES

BAKER, R.G. (1983). The contribution of coaching to transfer of training: An extension study. Ph.D. Thesis, University of Oregon.

BENNETT, B. (1987). The effectiveness of staff development training practices: A meta-analysis. Ph.D. Thesis, University of Oregon.

EVERTSON, C.M., EMMER, E.T., SANFORD, J.P. & CLEMENTS, B.S. (1983). Improving classroom management: An experiment in elementary school classrooms, Elementary School Journal, 84(2), pp. 173-188.

EVERTSON, C.M., EMMER, E.T., CLEMENTS, B.S., SANFORD, J.P. & WORSHAM, M.E. (1984). Classroom management for elementary teachers. (Englewood Cliffs: Prentice Hall).

FRASER, B.J., WALBERG, H.J., WELCH, W.W. & HATTIE, J.A. (1987). Syntheses of educational productivity research, International Journal of Educational Research, 11(2), pp. 147-252.

GOOD, T.L., GROUWS, D.A. & EBMEIER, H. (1983). Active mathematics teaching. (New York: Longman).

GOOD, T.L. & BROPHY, J.E. (1986). School effects, in: M.C. Wittrock (Ed.) Handbook of research on teaching, 3rd. ed., pp. 570-602 (New York: MacMillan).

GRIFFIN, G.A. & BARNES, S. (1986). Using research findings to change school and classroom practices: Results of an experimental study, American Educational Research Journal, 23(4), pp. 572-586.

JOYCE, B.R. & SHOWERS, B. (1980). Improving inservice training: The messages of research, Educational Leadership, 37(6) pp. 379-385.

JOYCE, B.R. & SHOWERS, B. (1988). Student achievement through staff development. (New York: Longman).

KIERSTEAD, J. (1986). How teachers manage individual and small-group work in active classrooms, Educational Leadership, 44(2) pp. 22-25.

KOUNIN, J.S. (1970). Discipline and group management in classrooms. (New York: Holt, Rinehart & Winston).

LEM, P., VEENMAN, S. & VOETEN, M. (1990) Zeitnutzung und Schulleistungen in Mehrstufenklassen, Zeitschrift für Pädagogische Psychologie, 4, 37-45.

LEM, P., VEENMAN, S., NIJSSEN, F. & ROELOFS, E. (1988). Omgaan met combinatieklassen: Verslag van een teamgerichte nascholing. (Dealing with mixed-age classes: Evaluation of a staff developement programme) ('s-Gravenhage: Instituut voor Onderzoek van het Onderwijs).

PURKEY, S.C. & SMITH, M.S. (1983). Effective schools: A review, Elementary School Journal, 83(4), pp. 427-451.

ROELOFS, E.C., RAEMAEKERS, J., VEENMAN, S.A.M. (1991). Verder met combinatieklassen: Effecten van teamgerichte nascholing en coaching. (Dealing with mixed-age classes: Follow-up study. Effects of a staff development programme and coaching) Eindrapport SVO-project 9343. Nijmegen: Vakgroep Onderwijskunde, Katholieke Universiteit Nijmegen.

ROSENSHINE, B.V. (1986). Synthesis of research on explicit teaching, Educational Leadership, 43(7) pp. 60-68.

ROSENSHINE, B.V. STEVENS, R. (1986). Teaching functions, in: M.C. Wittrock (Ed.) Handbook of research on teaching, 3rd. ed., pp. 376-391 (New York: MacMillan).

SHOWERS, B. (1982). Transfer of training: The contribution of coaching. Eugene, OR: Center for Educational Policy and Management.

SHOWERS, B. (1984). Peer coaching: A strategy for facilitating transfer of training. Eugene, OR: Center for Educational Policy and Management.

SQUIRES, D.A., HUITT, W.G. & SEGARS, J.K. (1983). Effective schools and classrooms: A research-based perspective. (Alexandria: Association for Supervision and Curriculum Development).

TYLER, S. (1979). Time-sampling: A matter of convention, Animal Behavior, 27, 801-810.

VEENMAN, S., LEM, P. & NIJSSEN, F. (1988). Omgaan met combinatieklassen: Een programma voor schoolverbetering (Dealing with mixed-age classes: A staff development programme for school improvement) ('s-Gravenhage: Instituut voor Onderzoek van het Onderwijs).

VEENMAN, S., LEM, P. & ROELOFS, E. (1989). Training teachers in mixed-age classrooms: Effects of a staff development programme. Educational Studies, 15(2), 165-180.

VEENMAN, S. LEM. P. & ROELOFS, E. (1990). Omgaan met combinatieklassen: Een onderzoek naar de effecten van een teamgericht nascholingsprogramma. Pedagogische Studiën, 67, 45-58.

VEENMAN, S., LEM, P. & VOETEN, M. (1988). Time-on-task in mixed-age classes, Journal of Classroom Interaction, 23(2), pp. 14-22.

VEENMAN, S., LEM, P., VOETEN, M., WINKELMOLEN B. & LASSCHE, H. (1986). Onderwijs in combinatieklassen (Education in mixed-age classes) ('s-Gravenhage, Instituut voor Onderzoek van het Onderwijs).

VEENMAN, S., LEM, P. & WINKELMOLEN B. (1985). Active learning time in mixed-age classes, Educational Studies, 11(3), pp. 171-180.

VEENMAN, S., VOETEN, M. & LEM, P. (1987). Classroom time and achievement in mixed-age classes, Educational Studies, 13(1), pp. 75-89.

WADE, R.K. (1985). What makes a difference in inservice teacher education: A meta-analysis of research. Educational Leadership, 41, 48-54.

WALBERG, H.J. (1986). Synthesis of research in teaching, in: M.C. Wittrock (Ed.) Handbook of research in teaching, 3rd. ed., 917-924 (New York: MacMillan).

WINER, B.J. (1971). Statistical principles in experimental design. (New York, McGraw-Hill).